

# SEQUENCE LISTING

<110> Hahn, Beatrice  
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Shaw, George

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SEQ 5

76

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SEQ 6

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B

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SEQ 7

78

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SEQ 8

79

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SEQ 13

84

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SEQ 15

86

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SEQ 16

87

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SEQ 17

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SEQ 21

92

B

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SEQ 22

93

B

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SEQ 23

94

B



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SEQ 24

95

B



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SEQ 25

96

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SEQ 26

97

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SEQ 27

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SEQ 28

99

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SEQ 29

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101

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SEQ 31

162

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SEQ 32

103

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SEQ 33

104

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   ttgcctggga cgatctacgg agcctgtgcc tcttcagttg ccaccgattg agagacttca 7860
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   ggagcagcat ctcaagactt agctaaacat ggagcactta caaccagcaa cacaccaagc 8280
20  aataatgctg ctggtgcctg gctgcaagcg caagaggagg aagaagaagt aggctttcca 8340
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   cttgatattt ggggtttataa cacacaaggc tacttccctg attggcaaaa ctacacacca 8520
   ggaccagggg tcagatatcc actgaccttt ggatggtgct acaagctagt accagttgac 8580
25  ccaagtgtag tagaagaggc caacaaagga gaaaacaact gtttgctaca ccctatgagc 8640
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30  cagatctgag cccgggagct ctctggctac ctagtgaacc cactgcttaa gcctcaataa 8940
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```

<210> 12

<211> 1479

35 <212> DNA

- <213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=gag

40

<400> 12

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   ctagaacgat ttgcacttga tccaggcctt ctagaaacat cagaaggctg tcgaaaaata 180
45  ataggacagt tacaaccatc ccttcagaca ggatcagaag agctcaaadc attatataat 240
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   ttagagaagc tagaggaaga acaaaaacaaa ggtcggcaaa agacacagca agcgactgct 360
   gaaaaagggg tcagtcaaaa ttaccctata gtacagaatc ttcagggaca aatggtacac 420
   cagtctttat cacctagaac tttaaagtga tgggtaaagg tgatagaaga gaaggctttt 480
50  agtccagaag taatacccat gttttcagca ttatcagaag gggccactcc acaagattta 540
   aacaccatgt taaatacagt ggggggacat caagcagcca tgcaaatgtt aaaagacacc 600
   atcaatgagg aggctgcaga atgggacaga ttacatccaa cacaggcagg acccatcccc 660
   ccaggtcaga taagggaacc taggggaagt gatatagctg gaactactag tacccttcag 720
   gaacaaatac aatggatgac aggcaaccga cctgtcccag tgggagaaaat gtataaaaaga 780

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SEQ 34

105

B

```

      tggatcatcc taggattaaa taaaatagta agaatgtata gccctgtcgg cattttggac 840
      ataagacaag ggccaaaaga acccttttaga gactatgtag acaggttctt taaaacccta 900
      agagctgagc aagctacaca ggaagtaaag ggttggatga cagacacctt gttgggtccaa 960
5     aatgcgaacc cagattgtaa gaccatttta aaagcattgg gaccaggggc tacactagag 1020
      gaaatgatga cagcatgtca gggagtggga ggacctagcc ataaggcaag agttttggct 1080
      gaggcaatga gccaaagcaac aaatacagct ataatgatgc agaaaagtaa ctttaagggc 1140
      caaagaagaa ttgttaaattg ctttaattgt ggcaaagaag gacacatagc caaaaattgc 1200
      agggccccta gaaaaaaggg ctgttgggaag tgtggaagag agggacacca aatgaaggac 1260
10    tgcactgaga gacaggctaa ttttttaggg aaaatttggc cttccaacaa ggggaggccc 1320
      ggaaacttca tccagaacag gccagagccg tcagccccgc cagcagagag cttcagggtc 1380
      ggggaggaga caaccccatc tccgaagcag gagcagaaag acgagggact gtaccctccc 1440
      ttagcttccc tcaaatcact ctttggcaac gaccctag 1479

```

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15    <210> 13
      <211> 579
      <212> DNA
      <213> Human immunodeficiency virus type 1

```

```

20    <220>
      <223> isolate=93BR020; gene=vif

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      <400> 13
      atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgag gattaacaca 60
      tggaaaagtt tagtaaaata ccatatgcat atttcaaaga aagccaaagg atggttttat 120
25    agacatcact ttgaaagcag gcatccaaaa ataagttcag aagtacacat cccactagag 180
      acagctgaat tagtaataac aacatactgg gggctgcttc caggagaaag agaatggcat 240
      ctgggtcagg gagtctccat agaatggagg caggggagggt atagaacaca aatagaccct 300
      ggcctggcag accaactgat ccatatatat tattttgatt gtttttcaga atctgccata 360
      aggaaagcca tattaggaca taaaattagc cctaggtgta actatcaagc aggacataac 420
30    aaggtaggat ctctacaata cttggcacta acagcattaa tagctccaaa aaagacaaag 480
      ccgcctttgc ctagtgtcca gaaactagta gaagacagat ggaacaagcc ccagaagacc 540
      aggggccaca gagagagcca tacaatgaat ggacactag 579

```

```

35    <210> 14
      <211> 291
      <212> DNA
      <213> Human immunodeficiency virus type 1

```

```

40    <220>
      <223> isolate=93BR020; gene=vpr

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      <400> 14
      atggaacaag ccccagaaga ccagggggcca cagagagagc catacaatga atggacacta 60
      gatcttttag aggagcttaa gaatgaagct gtttagacatt ttcctaggcc atggctccat 120
45    agcttaggac aacatatcta taacacctat ggggatactt gggaaggagt tgaagcaatc 180
      ataaggatat tgcaacaact actgtttatc catttcagaa ttgggtgccg tcatagcaga 240
      ataggcatta ctgcacagag aagagtaaga aatggaaacta gtagatccta a 291

```

```

50    <210> 15
      <211> 2610
      <212> DNA
      <213> Human immunodeficiency virus type 1

```

```

<220>

```

SEQ 35

156

B

<223> isolate=93BR020; gene=tat

<400> 15

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  ccttgtagca gatgttattg taaatgggtg tgctttcatt gttactgggtg ctttacaacg 120
  aagggccttag gcatctccta tggcaggaag aagcggagac agcgaccaag aactcctcaa 180
  agcagtcaga tacatcaaga ttttgtacca aagcagtaag tattgttaag catatgtaat 240
  gtcaaatttg ttagcaatag gcatagcagc attaatagta gcactaataa taacaatagt 300
10 gttatataaa agaataagcg aaagagcaga agacagtggc aatgagagtg agggggatgc 360
  agaggaattg gcagcacttg gggaagtggg gccttttatt cctggggaca ttaataatct 480
  gtaatgctgc agaaaactta tgggttacag tctattatgg ggtacctgtg tggaaagaag 540
  caaccactac tctattctgt gcatcagatg ctaaatcata tgaaaaagag gcacataatg 600
  tctgggctac acatgcttgt gtaccacag atcccaatcc acaagaagta gttctggaaa 660
15 atgtaacaga aaggtttaat atgtgggaaa ataacatggg agaacaaatg catacagata 720
  taatcagttt atgggatcaa agcctaaagc catgtgtgaa gttaacccca ctctgtgtta 780
  ctttagattg tagaaacatt gccaccaatg gcaccaatga cactattgcc atcaatgaca 840
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  gagataagca gctgaaagta catgcacttt tttataaact tgatatagta caaatcaaca 960
20 aggatgacaa tagaacatac agactaataa attgtgatgc ctcaaccatt acacaggctt 1020
  gtccaaagggt atcttgggat ccaattccca tacattattg tgctccagct ggttatgcga 1080
  ttctaaagtg taatgagaaa aatttcacag ggacaggggtc atgcaagaat gtcagtacag 1140
  tacaatgtac acatggaatt aaaccagtgg tatccactca attgttggtta aatggcagcc 1200
  tagcagaagg agagatagta atcagatctc aaaatatctc agataatgca aaaaccataa 1260
25 tagtgcacct taatgaatct gtacagatta attgtacaag acccaacaac aatacaagaa 1320
  aaagaatatc tttaggacca ggacgagtat tttatacaac aggagaaata ataggagaca 1380
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30 cagatgaact gtttaatgac acaaaattca atgacacagg attcaatggc actatcactc 1620
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35 caccaccaa ggcaaaaaga caagtgggtg agagagaaag aagagcagtg ggactaggag 1920
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45 tagtttttac tgtgctttct atagttaaata gagttaggaa gggatactca ctttgtcat 2520
  ttcagaccca tatcccaagc ccgagggaaac ccgacaggcc cgaaggaatc gaagaaggag 2580
  gtggagagca aggcaaagac agatccgtga 2610
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<210> 16

50 <211> 2661

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

SEQ 36

107

B

<223> isolate=93BR020; gene=rev

<400> 16

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   ggcatagcag cattaatagt agcactaata ataacaatag ttgtgtggac tatagcatat 180
   atagaatata agaaactggg aaggcaaaga aaaataaata ggttatataa aagaataagc 240
   gaaagagcag aagacagtgg caatgagagt gagggggatg cagaggaatt ggcagcactt 300
   ggggaagtgg ggccctttat tcctggggac attaataatc tgtaatgctg cagaaaactt 360
10  atgggttaca gtctattatg gggtagctgt gtggaaagaa gcaaccacta ctctattctg 420
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   tgtaccacac gatcccaatc cacaagaagt agttctggaa aatgtaacag aaaggtttaa 540
   tatgtgggaa aataacatgg tagaacaagt gcatacagat ataatcagtt tatgggatca 600
   aagcctaaag ccatgtgtga agttaacccc actctgtgtt acttttagatt gtagaaacat 660
15  tgccaccaat ggcaccaatg acactattgc catcaatgac actctgaagg aagatccaga 720
   ggcaatacaa aactgttctt tcaatacaac cacagaaata agagataagc agctgaaagt 780
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   taaaccagtg gtatccactc aattgttgtt aaatggcagc ctagcagaag gagagatagt 1080
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   tgtacagatt aattgtacaa gacccaacaa caatacaaga aaaagaatat ctttaggacc 1200
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   cagggggctg aagagggggt ggggaagctc caaatatctg gggaatctca cacagtattg 2640
   gggtcaggaa ctaaagaata g 2661
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50 <210> 17

<211> 246

<212> DNA

<213> Human immunodeficiency virus type 1

SEQ 37

128

B

<220>

<223> isolate=93BR020; gene=vpu

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aggttatata aaagaataag cgaaagagca gaagacagtg gcaatgagag tgagggggat 180  
gcagaggaat tggcagcact tggggaagtg gggcctttta ttcctgggga cattaataat 240  
ctgtaa 246

<210> 18

<211> 2541

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=env

<400> 18

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gtacctgtgt ggaaagaagc aaccactact ctattctgtg catcagatgc taaatcatat 180  
gaaaaagagg cacataatgt ctgggctaca catgcttgtg taccacaga tccaatcca 240  
25 caagaagtag ttctggaaaa tgtaacagaa aggtttaata tgtgggaaaa taacatggta 300  
gaacaaatgc atacagatat aatcagttta tgggatcaaa gcctaaagcc atgtgtgaag 360  
ttaacccac tctgtgttac tttagattgt agaaacattg ccaccaatgg caccaatgac 420  
actattgcca tcaatgacac tctgaaggaa gatccagagg caatacaaaa ctgttctttc 480  
aatacaacca cagaaataag agataagcag ctgaaagtac atgcactttt ttataaactt 540  
gatatagtac aaatcaacaa ggatgacaat agaacataca gactaataaa ttgtgatgcc 600  
30 tcaaccatta cacaggcttg tccaaaggta tcttgggatc caattcccat acattattgt 660  
gctccagctg gttatgcat tctaaagtgt aatgagaaaa atttcacagg gacagggtca 720  
tgcaagaatg tcagtacagt acaatgtaca catggaatta aaccagtggg atccactcaa 780  
ttgtttgttaa atggcagcct agcagaagga gagatagtaa tcagatctca aaatatctca 840  
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35 cccaacaaca atacaagaaa aagaatatct ttaggaccag gacgagtatt ttatacaaca 960  
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50 aactctagtt ggagtaataa atctcttgag gagatttggg ggaacatgac ctggatggag 1860  
tgggaaaaag aggttagcaa ttactcaaaa gaaatataca ggttaattga agactcgcag 1920  
aaccagcagg aaaagaatga acaagaatta ttagcattgg acaaatgggc aagtctgtgg 1980  
aattggtttg acataacaca gtggctgtgg tatataaaaa tattcataat gatagtagga 2040  
ggcttgatag gcttaagaat agtttttact gtgctttcta tagtaaatag agttaggaag 2100

SEQ 38

109

B

```

ggatactcac ctttgtcatt tcagacccat atcccaagcc cgaggggaacc cgacaggccc 2160
gaaggaatcg aagaaggagg tggagagcaa ggcaaagaca gatccgtgag attagtgacc 2220
ggattccttag ctcttgcctg ggacgacctg cggaacctgt gcctcttcag ctaccgccac 2280
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gctattagct tgcttaatgc cacagcaata gcagtagctg agtggacaga tagagttata 2460
gaagctttgc aaagagctgg tagagctatt ctcaacatac ctagaagaat aagacagggc 2520
ttggaagggt ctttgctata a 2541

10 <210> 19
    <211> 27
    <212> DNA
    <213> Human immunodeficiency virus type 1

15 <220>
    <223> isolate=93BR020; gene=nef

    <400> 19
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20 <210> 20
    <211> 8
    <212> DNA
    <213> Human immunodeficiency virus type 1

25 <220>
    <223> isolate=93BR020; gene=gag-pol fusion

    <400> 20
30 aaaaaaaaaa 8

    <210> 21
    <211> 207
    <212> DNA
35 <213> Human immunodeficiency virus type 1

    <220>
    <223> isolate=92NG083; gene=gag

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ttaaggccag ggggaaggaa aaagtataaa ctaaaacata tagtatgggc aagcagggaa 120
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45 <210> 22
    <211> 2739
    <212> DNA
    <213> Human immunodeficiency virus type 1

50 <220>
    <223> isolate=92NG083; gene=pol; note=NH2-terminus
        uncertain

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SEQ 39

110

B

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ttagtaggac ctacacctat taacataatt gggagaaata tgttgactca gattggttgt 180
5 actttaaact ttccaataag tcctattgaa actgtaccag taaaattaaa gccaggaatg 240
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at ttgttaaag acatggaaaa ggaaggaaaa atttcaaaaa ttgggcctga aaatccatat 360
aacactccaa tattcgccat aaagaaaaaa gacagtacta aatggagaaa attggtagat 420
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10 cccgcggggg taaaaaagaa aagatcagta acggtactag atgtgggaga tgcatacttt 540
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```

```

<210> 23
50 <211> 579
    <212> DNA
    <213> Human immunodeficiency virus type 1

<220>

```

SEQ 40

///

B



<223> isolate=92NG083; gene=vif

<400> 23

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   agacatcact atgaaagcag gcatccaaga gtaagtccag aagtacacat cccactaaga 180
   gatgctacac tagtagtaag aacatattgg ggtctgcatg caggagaaaa agactggcaa 240
   ttgggccatg gggtttccat agaatggagg cagaaaagat atagtacaca aatagaccct 300
10 aacacagcag accatctgat tcatctgtat ttttttact gtttttcaga atctgccata 360
   agaaaagcca tattaggaga gatagttagc cctaggtgtg aataccagc aggacataat 420
   aaggtaggat ctctacaata tctggcatcg aaagcattag taacaccaac aaggaaaagg 480
   ccacctttgc caagtgttgg gaaattagca gaagatagat ggaacaagcc ccagaagacc 540
   agggaccaca gagagaaccc tacaatgaat ggacattag 579
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15 <210> 24

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

20 <220>

<223> isolate=92NG083; gene=vpr

<400> 24

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   ggcttaggac agtatactta taacacttat ggggatactt ggggaaggagt tgaagccata 180
   ataagaatac tacaacaact actgtttatc catttcagaa tcgggtgcca acatagcaga 240
   ataggcatta ctccacagag aagagtaagg gatggaccg gtagacccta a 291
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30 <210> 25

<211> 2597

<212> DNA

<213> Human immunodeficiency virus type 1

35 <220>

<223> isolate=92NG083; gene=tat

<400> 25

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   aaaggcttag gcatctccta tggcaggaag aagcggagac cccgacgagg aactcctcag 180
   ggcagtaagg atcatcaaaa ccctgtacca aagcagtaag tagtaacaat taatatatgt 240
   aatgcaggcc ttagaaatat ctgactaata gtagcattca tagcagccac aatttgtgtg 300
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   agaaataaaa aactgctctt tcaagataac cacagaaagg ggaggcaaga agaaggaaga 900
   atacgcgctt ttctataaac ttgatgtggt accaattagt aatgggaata agactagtta 960
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SEQ 41

112

83

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ggagtacaat ggaacaggac catgtaaaaa tgtcagtaca gtacaatgta cacatggaat 1140
5 taagccagtg gtatcaactc aactactgct gaatggcagt ttagcagaag aagatataag 1200
aattagatct gaaaattttca cagacaatac caaagtcata atagtgcagc ttaataatag 1260
tatagaaatt aattgtatca gacccaataa caatacaaga aaaagtatac caatcggacc 1320
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ctataataat aagaacataa cctttaactc atctgcagga ggggacctag aaattacaac 1500
10 acatagtttc aattgtagag gagagttttt ctattgcaat acatcaggac tgtttaataa 1560
taatattagt aatattaata atgagactat cacactccca tgtaaaataa aacaaattgt 1620
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cagatccact cgattag 2597

```

```

30 <210> 26
    <211> 2663
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

35 <220>
    <223> isolate=92NG083; gene=rev

```

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    <400> 26
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tctgactaat agtagcattc atagcagcca caattgtgtg gagtatagta tttatagaat 180
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tgggggactt tgatccttgg gttggtaata attttagtg cctcagataa cttgtgggtc 360
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gtctcaacca ttaaacaggc ttgtccaaag gtaaattttg acccaattcc catacattat 900
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SEQ 42

113

B

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acagacaata ccaaagtcac aatagtgacag cttaataata gtatagaaat taattgtatc 1140
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5 acagggtgata taataggaga cataagacaa gcacattgta atgttagtag aataaaatgg 1260
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10 ggacaagcaa tgtatgccct tcccatcgca ggaaaccttg tatgtaaatc aaacattaca 1560
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tggggtcggg aactaaagaa tag 2663

```

```

30 <210> 27
    <211> 26
    <212> DNA
    <213> Human immunodeficiency virus type 1
35 <220>
    <223> isolate=92NG083; gene=vpu (defective); note=10 bp
        deletion early in vpu frameshifts, results in
        premature termination
40 <400> 27
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```

```

45 <210> 28
    <211> 2550
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

50 <220>
    <223> isolate=92NG083; gene=env

```

```

<400> 28
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cttgggttgg taataatttg tagtgcctca gataacttgt gggtcacagt ctattatggg 120

```

SEQ 43

114

B

```

gtacctgtgt gggaagatgc agataccccc ctattctgtg cctctgatgc taaatcatat 180
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gaacagatgc aggaggatat aatcagttta tgggaggaaa gcctaaagcc atgtgtaaag 360
5 ctaactcctc tctgtatcac tttaaactgt actaatgtaa acagtgtctaa tcatactgag 420
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40 agggttatag aagtagcaca aagagcttat agagctattc tcaacgtacc tacaaggata 2520
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<210> 29

<211> 1503

45 <212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=90CR056; gene=gag; CDS:

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SEQ 44

115

B

ctggaaagat ttgcacttaa ccccggcctt ttagaaacac cagaaggctg tctacagata 180  
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 taa 1503

25 <210> 30  
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 <212> DNA  
 <213> Human immunodeficiency virus type 1

30 <220>  
 <223> isolate=90CR056; gene=vif

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 ccacctttgc ctagtggttag aaagctagta gaggatagat ggaacaagcc ccagaagacc 540  
 aggggccaca gagggagcca cacaatgaat ggacactag 579

45 <210> 31  
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 <213> Human immunodeficiency virus type 1

50 <220>  
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<400> 31

SEQ 45

116

B

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caattaggac agcatatcta taacacctat ggagatactt gggtaggagt tgaagcttta 180
5 ataagaacgc tgcaacaact actgtttatt catttcagaa ttgggtgcc aatagcaga 240
ataggaatta ctcgacagag aagagtaaga aatggacca gtagatccta a 291

<210> 32
<211> 624
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10 <213> Human immunodeficiency virus type 1

<220>
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15 <400> 32
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ggagcaatca caagcagcaa tacagcaacc aacaatcctg attgtgcctg gctggaagca 180
20 caagaggagg actcagatgt aggctttccg gtcagaccac aggtaccttt gagaccaatg 240
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ctaatttact ccaagagaag acaagacatc cttgatctat gggctctataa tacacaagga 360
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gggtggtgct tcaaactagt accaatggac ccagcagaga tagaggaagc caataaggga 480
gagaacatca gtctattaca ccccatctgc cagcatggaa tggaggatga agacagagaa 540
25 gtgctggtat ggagatttaa cagtgccta gcacggagac acctagcccg agagctgcat 600
ccggagtact acaaagactg ctga 624

<210> 33
<211> 2606
30 <212> DNA
<213> Human immunodeficiency virus type 1

<220>
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35 7698..7782)

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gagctttaat atgtgggaaa ataacatggt ggagcagatg catacagaca taatcagttt 720
50 atgggatcaa agcttgaaac catgtgtaaa attaacccca ctctgtgtta ctctaaactg 780
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aaattgtaat acctcagtca ttacacaggc ttgcccagg gtgtcctttg aacctattcc 1020

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SEQ 46

117

B

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5 taaaaatata tcagacaata ccaaaaacat aatagtagag cttaagacac cagtaaacaat 1260
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tagaacaata agctttaagc caaactcagg aggggacatg gaagttagaa cacatagttt 1500
10 taattgtaga ggagaatttt tctattgcaa tacatcaggg ctgtttaata gtagttggga 1560
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15 ttggagaagt gaattgtata aatataaagt agtaaaaatt gaacctactg gaatagcacc 1860
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2606

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30 <211> 2657

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

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7698..7972)

<400> 34

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45 ggcaccttaa tcttggttat gttgctgac tgtagtgctg cacaaaactt gtgggttaca 360
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50 ccatgtgtaa aattaacccc actctgtgtt actctaaact gtactaatgt cagaaacaat 660
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SEQ 47

118

B

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 15 gcagcaggaa gcactatggg cgggcgctca ataacgctga cggtacaggc caggcaatta 1860  
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 ctggggagaa gggggaggga agccctcaaa tatctctgga atcttctaca atactgggga 2640  
 30 caggaactaa agaatag 2657

<210> 35  
 <211> 243  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

35  
 . <220>  
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 ctaattgaaa gaataggaga aagagcagaa gacagtggca acgagagtga tggagacaca 180  
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 tag 243

45  
 <210> 36  
 <211> 2538  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

50  
 <220>  
 <223> isolate=90CR056; gene=env

<400> 36

119

B



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 tggaaagagg caaaaaccac tctattctgt gcatcagatg ctaaggcata tgagacagaa 180  
 5 aagcataatg tctgggctac acatgcatgt gtaccacag accccaaccc acaagagatg 240  
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 catacagaca taatcagttt atgggatcaa agcttgaaac catgtgtaaa attaacccca 360  
 ctctgtgtta ctctaaactg tactaatgtc agaaacaata cctctaacag cactagcagt 420  
 atggaggcag gaggggaact aacaaattgc tctttcaatg taactacagt actaagagat 480  
 aagcagcaga aagtacatgc actcttttat agacttgatg tagtaccat tgataacaat 540  
 10 agtactcagt ataggctaact aaattgtaat acctcagtca ttacacaggc ttgcccagg 600  
 gtgtcctttg aacctattcc catacattat tgtgctccag ctggccttgc gattctaaag 660  
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 acacatggaa ttagaccagt ggtatcaact caactgctat taaatggaag cctagcagaa 780  
 15 gaacagatca taattagaac taaaaatate tcagacaata ccaaaaacat aatagtacag 840  
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 25 ggaggagata tgagggacaa ttggagaagt gaattgtata aatataaagt agtaaaaaatt 1440  
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 <211> 621  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

50 <220>  
 <223> isolate=90CR056; gene=nef

<400> 37

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 SEQ 49

120

B

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aggcgagctg aaccagtagc agaaggggta ggagcagtg ctcgagattt ggatagacgc 120
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caagaggacg gggaggaagt aggcctttcca gtcaggcctc aggtaccttt aagaccaatg 240
acctataagg gagcttttga tctcagccat tttttaaag aaaagggggg actggatggg 300
5 ttaattttact ccaagcaaag acaggacatc cttgatttat gggctctataa cacacaaggc 360
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gggtgggtgct tcaagctagt accagtaaat ccacaggagg tagaacaggc caatgaagga 480
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<210> 38

<211> 1486

<212> DNA

15 <213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=gag

20 <400> 38

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gctggaaaga tttgcactta accctgacct tttagagaca ccagaaggct gtaaacaat 180
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<210> 39

<211> 579

<212> DNA

50 <213> Human immunodeficiency virus type 1

<220>

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SEQ 50

121

B

<400> 39

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5 agacatcatt atgaaagcag acatccaaaa ataagttcag aagtacacat cccattaggg 180  
gaagctagat tagtaataaa aacatattgg ggtttgcaaa caggggaaag agattggcat 240  
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ggcctggcag gccaaactaat ccatatgcat tattttgatt gttttgcaga ctctgccata 360  
aggaaagcca tattaggaca tatagttagc cctaggtgtg actatcaagc aggacataat 420  
aaggtaggat ctctacaata cttggcactg acagcattga taaaaccaa aaagataaag 480  
10 ccacctctgc ctagtgtttag taaattagta gaggataaat ggaacaagcc ccagaagacc 540  
aggggccgca gagggaacca tacaatgaat ggacactag 579

<210> 40

<211> 291

15 <212> DNA

<213> Human immunodeficiency virus type 1

<220>

20 <223> isolate=92RW009; gene=vpr

<400> 40

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25 gacttaggac aatataatcta tgaaacctat ggggatactt ggaggggagat agaagctata 180  
ataagaattc tgcaacaact actgtttatc catttcagaa ttgggtgccg gcatagcaga 240  
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<210> 41

<211> 2640

30 <212> DNA

<213> Human immunodeficiency virus type 1

<220>

35 <223> isolate=92RW009; gene=tat

<400> 41

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40 aaaggcttag gcatttccta tggcaggaag aagcgggagac agcgacgaaa cgctcctcca 180  
agcagtgaag atcatcaaaa tcctatatca aagcagtaag tagtaataaa cagtatatgt 240  
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SEQ 51

122

B

5 ttctaaagtg taaagataaa aagttcaatg gaacagggcc atgcaagaat gtcagcacag 1140  
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 25 ggcagggata ctaccatta tcgtttcaga cccttatccc aaacccgagg ggacccgaca 2580  
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<210> 42

<211> 2658

30 <212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=rev

35

<400> 42

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SEQ 52

123

B

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ggggtgggaa acccttaa 2658

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<213> Human immunodeficiency virus type 1

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35 <223> isolate=92RW009; gene=vpu

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40 aggttaatta agaaaataag agaaagagca gaagatagt gcaatgagag tgatggggac 180  
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ttgtag 246

<210> 44  
45 <211> 2583  
<212> DNA  
<213> Human immunodeficiency virus type 1

<220>  
50 <223> isolate=92RW009; gene=env

<400> 44  
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SEQ 53

124

B

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 caagaaatag atttggaaaa tgtgacagaa gagtttaaca tgtggaaaaa taacatggta 300  
 gagcagatgc atacagatat aatcagttcta tgggaccaa gcctaaagcc atgtgttaaag 360  
 5 ttaacccttc tctgcgttac tttagagtgt aacaacatca ccaatgtcaa caacactgtc 420  
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 aatagcaata gtaataacag tagtcataat cagtataagg taataaattg taatacctca 600  
 gccattacac aggcctgttc aaaggtatcc tttgagccaa ttcccataaa ttattgtgcc 660  
 10 ccagctgggt tgcgatttct aaagtgtaaa gataaaaagt tcaatggaac agggccatgc 720  
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 aatgccaaaa ccataatagt acaacttaac gagactgtac aaattaattg ttccagacct 900  
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 taa 2583

45 <210> 45  
 <211> 624  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

50 <220>  
 <223> isolate=92RW009; gene=nef

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SEQ 54

125

B

```

      ggggcactta caagtagcaa cacacccagc aacaatgctg attgtgcctg gctggcagca 180
      caagaggagg aaaacgaagt aggctttcca gtcagacctc aggtgccttt aagaccaatg 240
      acttataaag cagcagttga tctcagcttc tttttaaaag aaaagggggg actggaaggg 300
5      ttaatttact ctaagaaaag gcaagacatc ctggatttgt ggggtctataa cacacaaggc 360
      tacttccttg attggcaaaa ctacacacca ggaccagggg tcagatatcc actgactttt 420
      ggatgggtgtt acaagctagt gccagttgac ccaagggaag tggaagaagc caatgaagga 480
      gaggacaact gcttactaca ccctctgagc cagcatggaa tggaggatga ggacagagaa 540
      gtcttaaagt ggaagtttga cagtcaccta gcacacagac acatggcccc cgagctacat 600
      ccggagtatt ataaagactg ctga                                           624

10      <210> 46
      <211> 8
      <212> DNA
      <213> Human immunodeficiency virus type 1

15      <220>
      <223> isolate=92RW009; standard name=3' LTR repeat
            region; note=3' R repeat should end one base
            beyond end of this

20      <400> 46
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      <210> 47
25      <211> 1494
      <212> DNA
      <213> Human immunodeficiency virus type 1

      <220>
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40      caagtggtag accagcccat atcacctagg actttaaatg catgggtaaa agtaatagaa 480
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SEQ 55

126

B

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aaggaatcac ctccattaac ctccctcaaa tctctcttg gcaacgaccc ctag 1494
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5 <210> 48  
 <211> 4307  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

10 <220>  
 <223> isolate=92NG003; gene=gag-pol fusion

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25 ggacctattc caccaggcca gataagagaa ccaaggggaa gtgatatagc aggaactact 720
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SEQ 56

127

B



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<211> 579

35 <212> DNA

<213> Human immunodeficiency virus type 1

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<223> isolate=92NG003; gene=vif

40

<400> 49

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<211> 114

SEQ 57

128

B

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<220>

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10

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<212> DNA

<213> Human immunodeficiency virus type 1

15

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<400> 51

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30 tgcctgtgta ccacagacc ccaaccaca agagataact ctggaaaatg taacagaaac 660  
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SEQ 58

129

B

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 gcagaaccag caggaaaaga atgaacaaga cttattggca ttggacaagt gggcaagttt 2340  
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 aggaggttta ataggtttta gaatagtttt tgctgtgctt tctatagtaa atagagttag 2460  
 gcagggatac tcacctttgt cattccagac ccttaccac caccagaggg aacccgacag 2520  
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 <213> Human immunodeficiency virus type 1

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 aaataaagaa acaggagaaa atagacaggt tacttgatag aataagagaa agagcagaag 240  
 atagtggcaa tgagagtga ggggacacag aggaattggc aacacttgtg gacatggtgg 300  
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 25 tattatgggg taccagtgtg ggaagacgca gatacccctc tattttgtgc atctgatgct 420  
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 30 aatgtgacca gcaactggga cagtgtctgg accaacgcta cgtgtaacat agaagaagca 720  
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 aataaatctt atgaggagat ttgggataac atgacctgga tacaatggga aagggaagtc 2100  
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SEQ 59

130

B

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5   tcattccaga cccttaccca ccaccagagg gaacccgaca ggcccgaag aatcgaagaa 2400
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    taagagaaaag agcagaagat agtggcaatg agagtgaagg ggacacagag gaattggcaa 180
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25  <210> 54
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30  <220>
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    <400> 54

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    aatacatcag gattgtttta tgaatcagga gggaatgata ccactatcac actcccattg 1200
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SEQ 60

131

B

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45 <210> 56  
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50 <220>  
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SEQ 61

132

B

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 50 tacaatgtgc ttccacaggg gtggaagga tcaccagcaa tattccaaag tagcatgaca 960  
 aaaatcttag agccttttag aaaacaaaat ccagacatag ttatctatca atacatggat 1020  
 gatttgtatg taggatctga cttagaaata gggcagcata gaactaagat agaggaattg 1080  
 agacagcatt tgttgagggt gggatttacc acaccagaca aaaaacatca gaaagaacct 1140  
 ccattccttt ggatgggtta tgaactccat cctgataaat ggacagtaca gcctatagt 1200

SEQ 62

133

B

```

ctgccagaaa aagacagctg gactgtcaat gacatacaga agttagtggg aaaattgaat 1260
tgggcaagtc agatttatgc agggattaaa gtaaggcaat tatgtaaact ccttagggga 1320
accaaagcac taacagaagt agtaccacta acagcagagg cagagctaga actggcagaa 1380
aacagggaga ttctaaaaga accagtacat ggagtgtatt atgacccctc aaaagactta 1440
5 atagcagaaa tacagaaaca ggggcaaggc caatggacat atcaaattta tcaagagcca 1500
tataaaaatt tgaaaacagg aaagtatgca aggatgaggg gtgcccacac taatgatgta 1560
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attcctaaat ttaaactacc catacaaaaa gaaacgtggg aagcatgggt gatagagtat 1680
tggaagcca cctggattcc tgagtgggag tttgtcaata cccctccctt agtgaaatta 1740
10 tggtagcagt tagagaaaga acccatagta ggagcagaaa ctttctatgt agatggggga 1800
gctaataagg aaactaaatt aggaaaagca ggatatgtga ctgacagagg aagacaaaaa 1860
gttgtcccc taacggacac aacaaatcag aaaactgagt tacaagcaat tcatctagct 1920
ttgcaggatt cgggattaga agtaaacata gtaacagact cacaatatgc attaggaatc 1980
attcaagcac aaccagataa gagtgaatta gaaatagtca atcaaataat agagcagtta 2040
15 ataaaaaagg aaaagatcta cctggcatgg gtaccagcac acaaaggaat tggaggaaat 2100
gaacaagtag acaaattagt cagttctgga atcaggaaag tactattttt agatggaata 2160
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ggaagatggc cagtaaaaac aatacacaca gacaatggca gcaatttcac cagtactaca 2520
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25 agggatcagg ctgaacatct taagacagca gtacaaacgg cagtattcat ccacaatttt 2700
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acagacatac agactaaaga attacaaaaa caaattacaa aaattcaaaa ttttcgggtt 2820
tattacagag acagcagaga tccacttttg aaaggaccag caaagcttct ctggaaaggt 2880
gaaggggcag tagtaataca agataatagt gacataaaag tagtgccaag aagaaaagta 2940
30 aagatcatta gggattatgg aaaacagatg gcagggtggtg attgtgtggc aggtagacag 3000
gatgaggatt aa 3012

```

<210> 58

<211> 579

35 <212> DNA

• <213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=vif

40

<400> 58

```

atggaaaaca gatggcaggt ggtgattgtg tggcaggtag acaggatgag gattaacaca 60
tggaagatt tagtaaaata ccatatgcat gtttcaaaga aagccaaaag atggttttat 120
45 agacatcact ttgaaagcag gcatccaaga gtaagttcag aagtacatat cccactagag 180
gaagctaaat tagtaataac aacatattgg gggctgcata caggagaaaag agattggcat 240
ctgggtcagg gagtctccat agaatggagg caggggaggt ataggacaca aatagaccct 300
ggcctggcag accaactgat ccatatatat ttttttgatt gtttttcaga atctgccata 360
aggaaagcca tattaggaca tagaattagc cctaggtgtg attatcaagc aggacataac 420
aaggtaggat ctctacagta cttggcacta acagcattaa taaaaccaaa aaagagaaaag 480
50 ccacctttgc ccagtgttaa gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aaggaccaca gagggagcca tacaatgaat ggacactag 579

```

<210> 59

<211> 291

SEQ 63

134

B

<212> DNA  
<213> Human immunodeficiency virus type 1

<220>

5 <223> isolate=93BR029; gene=vpr

<400> 59

atggaacaag ccccaagaaga ccaaggacca cagagggagc catacaatga atggacacta 60  
gaacttttag aggaacttaa gagtgaagct gtagacatt ttcctaggtt atggctccat 120  
10 agcttaggac aacatatcta tgaaacttat ggggatactt gggcaggagt ggaagccata 180  
ataagaattc tgcaacaact gctgtttatt catttcagaa ttggatgtca acatagcaga 240  
ataggcatta atcgacagag gagagcaagg aatggagcca gtagatccta g 291

<210> 60

15 <211> 2601

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

20 <223> isolate=93BR029; gene=tat

<400> 60

atggagccag tagatcctag actagagccc tggaagcacc caggaagtcg gcctcagacg 60  
gcttgtaata gttgctattg taaaaagtgt tgctttcatt gtcaagtttg tttcacaaca 120  
25 aagggccttag gcatctccta tggcaggaag aagcggagac agcgacacag aactcctcaa 180  
agcagtcagc tacatcaaga tccgtgtacca aagcagtaag tattgttaag taatatatgt 240  
aatgtcatat ttgttagtaa taggtttagc agcattaata gcagcactaa taatagcaat 300  
agttgtgtgg actatagcat atatagaata tagggaacta gtaaggcaaa gaaaaataaa 360  
taggttatat aaaagaataa gagaagagc agaagacagt ggcaatgaga gtgaggggga 420  
30 tgcagaggaa ttggcagcac ttggggaaat ggggcctttt attcctgggg atattgataa 480  
tctgtaatgc tgaaaacttg tgggtcacag tctattatgg ggtacctgtg tggaagaag 540  
caaccactac tttattctgt gcatcagatg ctaaaagcata tgaaaaagaa gcacataatg 600  
tctgggctac acatgcctgt gtaccacag atcccaatcc acaagaagta gttctggaaa 660  
atgtaacaga aaattttgat atgtggaaaa ataacatggt agaacaatg catacagata 720  
35 taatcagttt atgggatcaa agcctgaagc catgtgtgaa gttaaccca ctctgtgtta 780  
ctttacgttg tagtaatgcc actaccaaca gtactcaaaa cgacaccctg aaggaagagc 840  
caggggcaat acaaaactgt tctttcaata tgaccacaga agtaagagat aagcagctga 900  
aagtacatgc acttttttat aggcttgata tagtaccat cagcaatgat aatagtagca 960  
atgataatag tagcagagaa tacaggctaa taaattgtaa tacctcaacc cttacacagg 1020  
40 cttgtccaaa ggtatcttgg gatccaattc ccatacatta ttgtgctcca gctgggtatg 1080  
cgattctaaa gtgtaatgat aaaaaattca atgggacggg gccatgcagg aatgtcagca 1140  
cagtacaatg tacacatgga attaaaccag tggtatcaac tcaattgttg ttaaatggca 1200  
gcctagcaga aaaagatata ataatcagat ctcaaaatat ctgagataat gcaaaaacca 1260  
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45 gaaaaagtat accaatagga ccaggacgag cattttatag aacaggagaa ataataggag 1380  
acatcagaaa ggcacattgt aacgttagtg gaacaaaatg gaatgagacg ttagaaaagg 1440  
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gaggggacct agaaattaca atgcatagtt ttaattgtag aggagaattt ttctactgca 1560  
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50 taaagcaaat tgtaaatatg tggcaggaag tggggcgagc aatgtatgcc gctcccattg 1680  
caggaaacat tacctgtagc tcaaatatta caggtctact attgacaaga gatggtggtc 1740  
agaataatca gacggaggag accttcagac ctgggggagg aaatatgaaa gacaactgga 1800  
gaagtgaatt atataaatat aaagtagtag aaattgagcc attaggagta gcaccaccca 1860  
aggcaaaaag acaagtgtgt aagagagaaa aaagagcagt gggaatggga gctttgttcc 1920

SEQ 64

135

B



```

    ttgggttctt gggagcagca ggaagcacta tgggcgcagc gtcaataacg ctgacggcac 1980
    aggccagaca attattgtct ggcatagtgc aacagcagaa taatttgctg agggctattg 2040
    aagcgcaaca gcatctgttg cagctcacag tctggggcat taaacagctc caggcaagaa 2100
    tcctggctgt ggaaagatac ctaaaggatc aacagctcct agggcttttg ggctgctctg 2160
5   gaaaactcat ctgcaccact gatgtgccct ggaactctag ttggagtaac aaatctcagg 2220
    agaagatctg ggggaacatg acctggatgg agtgggaaaa agagattagc aattactcaa 2280
    acgaaatata taggttaatt gaagagtcgc agaaccagca ggaaaagaat gaacaagaat 2340
    tattggcatt ggacaaatgg gcaagtctgt ggaattgggt tgacatatca aaatggctgt 2400
    ggtatataaa aatattcata atgatagtag gaggcttgat aggcctaaga atagtttttg 2460
10  ctgtgctttc tatagtaaat agagtttaga agggatactc accttggtca ttacagaccc 2520
    gcttccaag cccaaggga cccgacaggc ccgaaggaa cgaagaagga ggtggagagc 2580
    caggcaaga cagatccgtg a                                     2601

```

```

<210> 61
15  <211> 2652
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

<220>
20  <223> isolate=93BR029; gene=rev

```

```

<400> 61
    atggcaggaa gaagcggaga cagcgacaca gaactcctca aagcagtcag ctacatcaag 60
    atcctgtacc aaagcagtaa gtattgttaa gtaatataatg taatgtcata tttgttagta 120
25  ataggttttag cagcattaat agcagcacta ataatagcaa tagttgtgtg gactatagca 180
    tatatagaat atagggaact agtaaggcaa agaaaaataa ataggttata taaaagaata 240
    agagaaagag cagaagacag tggcaatgag agtgaggggg atgcagagga attggcagca 300
    cttggggaaa tggggccttt tattcctggg gatattgata atctgtaatg ctgaaaactt 360
    gtgggtcaca gtctattatg gggtaacctgt gtggaaagaa gcaaccacta ctttattctg 420
30  tgcatacaga gctaaaagcat atgaaaaaga agcacataat gtctgggcta cacatgcctg 480
    tgtaccacaca gatcccaatc cacaagaagt agttctggaa aatgtaacag aaaattttga 540
    tatgtggaaa aataacatgg tagaacaat gcatacagat ataatcagtt tatgggatca 600
    aagcctgaag ccatgtgtga agttaacccc actctgtgtt actttacgtt gtagtaatgc 660
    cactaccaac agtactcaaa acgacaccct gaaggaagag ccaggggcaa tacaaaactg 720
35  ttctttcaat atgaccacag aagtaagaga taagcagctg aaagtacatg cactttttta 780
    taggcttgat atagtaccaa tcagcaatga taatagtagc aatgataata gtagcagaga 840
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    ggatccaatt cccatacatt attgtgtctc agctgggtat gcgattctaa agtgtaatga 960
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40  aattaaacca gtggtatcaa ctcaattggt gttaaattggc agcctagcag aaaaagatat 1080
    aataatcaga tctcaaaata tctcagataa tgcaaaaacc ataatagtag aacttaattg 1140
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    accaggacga gcattttata caacaggaga aataatagga gacatcagaa aggcacattg 1260
    taacgttagt ggaacaaaat ggaatgagac gttagaaaag gtaagggcaa agttaaaagg 1320
45  tcatttcctt aatgcaacaa taaaatttaa ctcatcctca ggaggggacc tagaaattac 1380
    aatgcatagt tttaattgta gaggagaatt tttctactgc aatacatcag gactgtttta 1440
    tgacacagta gacaatggca ctatcactct cccatgtcga ataaagcaaa ttgtaaatat 1500
    gtggcaggaa gtggggcgag caatgtatgc cgctcccat gcaggaaaca ttacctgtag 1560
    ctcaaatatt acaggtctac tattgacaag agatggtggt cagaataatc agacggagga 1620
50  gaccttcaga cctgggggag gaaatatgaa agacaactgg agaagtgaat tatataaata 1680
    taaagtagta gaaattgagc cattaggagt agcaccacc aaggcaaaaa gacaagtgg 1740
    gaagagagaa aaaagagcag tgggaatggg agctttgttc cttgggttct tgggagcagc 1800
    aggaagcact atgggcgcag cgtcaataac gctgacggca caggccagac aattattgtc 1860
    tggcatagtg caacagcaga ataatttgct gagggctatt gaagcgcaac agcatctgtt 1920

```

SEQ 65

136

B

```

gcagctcaca gtctggggca ttaaacagct ccaggcaaga atcctggctg tggaaagata 1980
cctaaaggat caacagctcc tagggctttg gggctgctct ggaaaactca tctgcaccac 2040
tgatgtgccc tggaaactcta gttggagtaa caaatctcag gagaagatct ggggggaacat 2100
gacctggatg gagtgggaaa aagagattag caattactca aacgaaatat ataggttaat 2160
5 tgaagagtct cagaaccagc aggaaaagaa tgaacaagaa ttattggcat tggacaaatg 2220
ggcaagtctg tgggaattggt ttgacatatc aaaatggctg tggatatataa aaatattcat 2280
aatgatagta ggaggcttga taggcttaag aatagttttt gctgtgcttt ctatagtaaa 2340
tagagttagg aagggatact cacctttgtc attacagacc cgcttcccaa gcccagggga 2400
acccgacagg cccgaaggaa tcgaagaagg aggtggagag ccaggcaaag acagatccgt 2460
10 gagattagtg aacggattct tagctcttgt ctgggacgac ctgaggaacc tgtgcctctt 2520
cagctaccgc cacttgagag acttcatatt aattgcagcg aggattgtgg acaggggact 2580
gaagaggggg tgggaagccc tcaaacttct ggggaatctc gcgctgtatt ggagtcagga 2640
actaaagaat ag                                     2652

```

```

15 <210> 62
    <211> 2529
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

20 <220>
    <223> isolate=93BR029; gene=env

```

```

<400> 62
25 atgagagtga ggggggatgca gaggaattgg cagcacttgg ggaaatgggg cctttttattc 60
   ctgggggatat tgataatctg taatgctgaa aacttgtggg tcacagtcta ttatggggta 120
   cctgtgtgga aagaagcaac cactacttta ttctgtgcat cagatgctaa agcatatgaa 180
   aaagaagcac ataatgtctg ggctacacat gcctgtgtac ccacagatcc caatccacaa 240
   gaagtagttc tggaaaaatgt aacagaaaat ttgatatgt ggaaaaataa catggtagaa 300
   caaatgcata cagatataat cagtttatgg gatcaaagcc tgaagccatg tgtgaagtta 360
30 accccactct gtgttacttt acgttgtagt aatgccacta ccaacagtac tcaaacgac 420
   accctgaagg aagagccagg ggcaatacaa aactgttctt tcaatatgac cacagaagta 480
   agagataagc agctgaaagt acatgcactt ttttataggc ttgatatagt accaatcagc 540
   aatgataata gtagcaatga taatagtagc agagaataca ggctaataaa ttgtaatacc 600
   tcaaccctta cacaggcttg tccaaaggta tcttgggac ccaattcccat acattattgt 660
35 gctccagctg ggtatgcgat tctaaagtgt aatgataaaa aattcaatgg gacggggcca 720
   tgcaggaatg tcagcacagt acaatgtaca catggaatta aaccagtggg atcaactcaa 780
   ttgttgttaa atggcagcct agcagaaaaa gatataataa tcagatctca aaatatctca 840
   gataatgcaa aaaccataat agtacaaact aatgtatctg tgccgattaa ttgtacaaga 900
   cccaacaaca atacaagaaa aagtatacca ataggaccag gacgagcatt ttatacaaca 960
40 ggagaaataa taggagacat cagaaaggca cattgtaacg ttagtggaac aaaaatggaat 1020
   gagacgttag aaaaggtaag ggcaaagtta aagcctcatt tccctaattg aacaataaaa 1080
   tttaactcat cctcaggagg ggacctagaa attacaatgc atagttttta ttgtagagga 1140
   gaatttttct actgcaatac atcaggactg tttaatgaca cagtagacaa tggcactatc 1200
   actctcccat gtcgaataaa gcaaattgta aatatgtggc aggaagtggg gcgagcaatg 1260
45 tatgccgctc ccattgcagg aacattacc tgtagctcaa atattacagg tctactattg 1320
   acaagagatg gtggtcagaa taatcagacg gaggagacct tcagacctgg gggaggaaat 1380
   atgaaagaca actggagaag tgaattatat aaatataaag tagtagaaat tgagccatta 1440
   ggagtagcac ccaccaaggc aaaaagacaa gtggtgaaga gagaaaaaag agcagtggga 1500
   atgggagctt tgttccttgg gttcttggga gcagcaggaa gcactatggg cgagcgtca 1560
50 ataacgtga cggtcaggc cagacaatta ttgtctggca tagtgcaaca gcagaataat 1620
   ttgctgaggg ctattgaagc gcaacagcat ctgttgacgc tcacagtctg gggcattaaa 1680
   cagctccagg caagaatcct ggctgtggaa agatacctaa aggatcaaca gctcctaggg 1740
   ctttggggct gctctggaag actcatctgc accactgatg tgccctggaa ctctagtgtg 1800
   agtaacaaat ctcaggagaa gatctggggg aacatgacct ggatggagtg ggaaaaagag 1860

```

SEQ 66

137

B

```

attagcaatt actcaaacga aatatatagg ttaattgaag agtcgcagaa ccagcaggaa 1920
aagaatgaac aagaattatt ggcattggac aaatgggcaa gtctgtggaa ttggtttgac 1980
atatcaaaat ggctgtggta tataaaaata ttcataatga tagtaggagg cttgataggc 2040
5 ttaagaatag tttttgctgt gctttctata gtaaataagag ttaggaaggg atactcacct 2100
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10 cttaatacca cagcaatagt agtagctgag gggacagata gagttataga agctttgcaa 2460
agagcgggta gagctgttct taacgtacct agaagaataa gacagggctt ggaaagggct 2520
ttgctataa 2529

```

```

<210> 63
15 <211> 621
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

<220>
20 <223> isolate=93BR029; gene=nef

```

```

<400> 63
atgggtagca agtgggtcaaa aagtagtata gttgggtggc ctgctataag ggaaagatta 60
agacaaaccc ctccagcagc agaaggggtg ggagcagtgt ctcaagactt agaaagacgg 120
25 ggggcaatta caagcagcaa tactggagct aataatcctg acttggcctg gctggaggca 180
caagaggaag aggaagtagg ctttccagtc agacctcagg tacctttaag accaatgact 240
tataagggag ctcttgatct cagtcacttt ttaaaagaaa aggggggact ggaaggggta 300
atattattcca agaaaagaca agagatcctt gatctgtggg tttaccacac acaaggctac 360
ttccctgatt ggcagaacta cacaccaggg ccagggacca gatatccact gaccttaggg 420
30 tgggtgcttca agctagtacc agttgaccca gaggaggtag aaaaggccaa tgaaggagag 480
aacaactgct tgctacaccc catgagccaa catggaatgg aggatgaaga cagagaaata 540
ctgcagtggg gggttgacag ccgcctagca tttcatcaca tggcccgaga gctgcatccg 600
gagtactaca aggactgctg a 621

```

```

35 <210> 64
    <211> 1503
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

40 <220>
    <223> isolate=94CY032.3; gene=gag

```

```

<400> 64
atgggtgcga gagegtcagt attaagtggg ggaaaattag atgcatggga gaggattcgg 60
45 ttaaggccag ggggaaagaa aaaatataga ctgaaacatc tagtatgggc aagcagagag 120
ttggaaagat tcgcacttaa ccttggcctt ttagaaacag cagaaggatg tcaacaatta 180
atggaacagt tacaatcaac tctcaaaaca ggatcagaag aacttagatc attatataat 240
actataacaa ccctctgggt cgtacatcaa agaatagatg tacaagacac caaggaagct 300
ttagataaaa tagaggaaat acaaagtaag agcaagcaaa agacacagca ggcagcagct 360
50 gccgcaggag gtagcagcaa tgtagccaa aattacccta tagtgcaaaa tgcacaaggg 420
caaatggtac atcagagcat ttcacctaga actttgaatg catgggtaaa agtaatagaa 480
gaaaaggctt tcagcccaga agtaataccc atgttctcag cattatcaga gggagccacc 540
ccacaagatt tgaacatgat gctaaatata gtggggggac accaggcagc aatgcaaatg 600
ttaaagata ccatcaatga ggaagctgca gactgggaca ggacacatcc agtacatgca 660

```

SEQ 67

138

B

5 gggcctattc caccaggcca gatgagagaa ccaaggggaa gtgatatagc aggaactact 720  
 agtacccttc aagaacaaat aggatggatg acaagcaacc cacctgtccc agtgggagaa 780  
 atctataaaa gatggataat cttgggggta aataaaatag taagaacgta tagccccatt 840  
 agcatcttgg acataagaca aggacccaaa gaacccttca gagattatgt agatagggttc 900  
 tttaaatgtc tcagagcaga acaagctacc caggaggtga aaaattggat gacagaaacc 960  
 ctgctgggtcc aaaatgcgaa tccagactgt aagtccatct taaaagcatt aggaacaggg 1020  
 gctacattag aagaaatgat gacagcatgt caggaggtgg gaggaccag ccataaagca 1080  
 agagttttag ctgaggcaat gagccaggca tcaaatgcag cagcagccat aatgatgcag 1140  
 aaaagcaaat ttaagggcca aagaagaact attaatgttt tcaactgtgg caaggaagga 1200  
 10 catctagcca gaaattgcag ggcccctagg aaaaagggt gctggaagtg tggaaaggag 1260  
 ggacatcaaa tgaaagactg cactgagaga caggctaatt ttttagggag aatgtggcct 1320  
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20 <213> Human immunodeficiency virus type 1

<220>

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SEQ 68

139

B

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SEQ 69

14D

B

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SEQ 70

141 B

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tag 2643

5
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<212> DNA
<213> Human immunodeficiency virus type 1

10
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SEQ 71

14/2

B

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<211> 246

<212> DNA

10 <213> Human immunodeficiency virus type 1

<220>

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<210> 71

<211> 2571

<212> DNA

25 <213> Human immunodeficiency virus type 1

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SEQ 72

1413

B



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<211> 660

<212> DNA

<213> Human immunodeficiency virus type 1

25

<220>

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 ctggaaagat ttgcgcttaa ccctggcctt ttagaaacat cagaaggctg taaacaaata 180  
 atgaaacagc tacaaccagc tcttcagaca ggaacggagg aacttagatc attatacaac 240

SEQ 73

144

B

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atggtacacc agaaactatc acctagaact ttgaatgcat gggtaaaagt aatagaagaa 480
5 aaagctttta gccagaggt aatacccatg ttacagcat tatcagaagg agccacccca 540
caagatttaa acaccatggt aaatacagtg gggggacatc aagcagccat gcaaagtgtta 600
aaagatacta tcaatgagga ggctgcagaa tgggatagat tacatccagt gcatgcaggg 660
cctattgcac caggccaaat gagagaacca aggggaagtg atatagcagg aactactagt 720
accctccaag aacagatagc atggatgaca agtaatcccc ctattccagt gggagacatc 780
10 tataaaagat ggataattct ggggttaaata aaaatagtaa gaatgtatag ccctgtcagc 840
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15 gtgttggctg aggcaatgag ccaaacaat agtgtaaaca tactgatgca gaaaagcaat 1140
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20 ttcaggttcg aggagacaac ccccgctccg aagcaggagt cgaaagacag ggaagcctta 1440
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<210> 74

<211> 3000

25 <212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=pol

30

<400> 74

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35 gaagcaggag tcgaaagaca gggaagcctt aacttccctc aaatcactct ttggcagcga 180
ccccttgtct caataaaggt agggggccaa ataaaggagg ctctcttaga cacgggagca 240
ggtgatacag tattagaaga aataaatttg ccaggcaaat ggaaaccaa aatgatagga 300
ggaattggag gctttatcga agtaagacaa tatgatcaaa tacctatgga aatttgtgga 360
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atgttgactc agcttggatg cactactaat tttccaatta gtcctattga aactgtacca 480
40 gtaaaattaa agccaggaat ggatggccca aaggttaaac aatggccatt gacagaagag 540
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gatagctgga ctgttaatga tatacagaag ttatgggaa aattaaactg ggcaagttag 1260
atttacgcag ggattaaagt aaggcaactt tgtaaactcc ttaggggagc caaagcacta 1320
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SEQ 74

145

B

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      aaaacagggg agtatgcaaa aatgaggaca gccacacta atgatgtaaa acagttaaca 1560
5     gaggcagtcg aaaaaatagc cctggagagc atagtaatat ggggaaagat tcctaaat 1620
      agactacca tccaaaaaga aacatgggaa acatgggtga cagactattg gcaagccacc 1680
      tggattcctg agtgggagtt tgttaatacc cctctcttag taaaattatg gtaccagctg 1740
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      actaaattag gaaaagcagg gtatattact gacagaggaa ggcaaaaaat tgttactcta 1860
10    actgaaacaa caaatcagaa gactgaatta caagcaattt acctagcttt gcaagattca 1920
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      aggtctacc tgtcatgggt accagcacat aaaggaattg gaggtaatga acaggtagat 2100
      aaattagtaa gcaaggggat caggaaagtg ctgtttctag atggaataga caaggctcaa 2160
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25    agcagagacc ccatttggaa aggaccagcc aaactactct ggaaagggtga aggggcagta 2880
      gtaatacaag ataatagtga cataaaagtg gtaccaagga ggaaagcaaa aatcattagg 2940
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```

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30    <210> 75
      <211> 579
      <212> DNA
      <213> Human immunodeficiency virus type 1

```

```

      <220>
35    <223> isolate=96ZM651.8; gene=vif

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      <400> 75
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      agacatcatt atgaaagcag acatccaagg gtaagttcag aagtacatat cccattaggg 180
      gatgctaaat tagtaataaa aacatatttg ggtttgcaaa caggagaaag agattggcat 240
      ttgggtcatg gagtctccat agaatggaga ttgagaagat atagcacaca agtagaccct 300
      ggcttgccag accagctaatt tcatatgcac tattttgatt gttttgcaga ctctgccata 360
      agaaaagcca tattaggaca catagtattt cctaggtgtg actatcaagc aggacataat 420
45    aaggtaggat ctctgcaata cttggcactg acagcattga taaaaccaa aaagagaaaag 480
      ccacctctgc ctagtgttag gaaattagta gaggatagat ggaacaattc ccagaagacc 540
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```

```

50    <210> 76
      <211> 291
      <212> DNA
      <213> Human immunodeficiency virus type 1

```

```

      <220>

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SEQ 75

14/6

B

<223> isolate=96ZM651.8; gene=vpr

<400> 76

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agcttaggac aacatatcta tgaaacttat ggggatactt ggactggagt cgaggctata 180  
ataagaatac tgcaacaact actgtttatt catttcagaa ttgggtgcca gcacagcaga 240  
ataggcatgg ttcgacagag aagagcgaga aatggagcca gtagatccta g 291

10 <210> 77

<211> 2666

<212> DNA

<213> Human immunodeficiency virus type 1

15 <220>

<223> isolate=96ZM651.8; gene=tat

<400> 77

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ctagcaagag taaattatag agtaggagta ggagcattga tagtagcact actcatagca 300  
atagttgtgt ggaccatagc atatatagaa tataggaagc tgttaagaca aagaaaaata 360  
25 gactgggttaa ttaaaagaat tagggaaaga gcagaagaca gtggcaatga gagtgaggga 420  
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gatttgtaat gtgtggggga acttgtgggt cacagtctat tatggggtag ctgtgtggaa 540  
agaagcaaaa actactctat tctgtgcatc agatgctaaa tcatatgaga aagaagtga 600  
30 taatgtctgg gctacacatg cctgtgtacc cacagacccc aaccacaag aaatagtttt 660  
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ggatataatc agttttatggg atcaaaagct aaagccatgt gtaaagttga cccactctg 780  
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SEQ 76

147

B

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tgtactctct atagtgaata gagttaggca gggataactca cctttgtcgt ttcagaccct 2580
tatcccgaac ccaaggggaa cgcacaggcc aggaagaatc gaagaagaag gtggagagca 2640
agacaaagag agatccgtgc gattag 2666

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10 <210> 78
    <211> 2684
    <212> DNA
    <213> Human immunodeficiency virus type 1

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15 <220>
    <223> isolate=96ZM651.8; gene=rev

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20 <400> 78
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gcctgtgtac ccacagaccc caaccacaaa gaaatagttt tgggaaatgt aacagaaaaat 540
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caactcacgg tctggggcat taagcagctc cagacaagag tcctggctat agaaagatac 2040
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SEQ 77

148 B

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 gaggactcgc agagccagca ggagcaaaat gaaaaagatt tattagcatt ggacagttgg 2280  
 5 aacaatctgt ggaattgggt tgacataaca aaatggctgt ggtatataaa aatatttata 2340  
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 10 agctaccacc gattgagaga cttcatattg gtgacagcga gagcgggtgga gcttctgaga 2640  
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<210> 79

<211> 261

<212> DNA

15 <213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=vpu

20 <400> 79

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 caaagaaaaa tagactggtt aattaaaga attagggaaa gagcagaaga cagtggcaat 180  
 gagagtgagg gagatactga ggaattggca acgatgggtg acatggggca tcttaggctt 240  
 25 ttggatgtta atgatttgta a 261

<210> 80

<211> 2607

<212> DNA

30 <213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=env

35 <400> 80

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 gtacctgtgt ggaaagaagc aaaaactact ctattctgtg catcagatgc taaatcatat 180  
 40 gagaaagaag tgcataatgt ctgggtctaca catgcctgtg taccacaga cccaaccca 240  
 caagaaatag ttttgggaaa tgtaacagaa aattttaaca tgtggaaaaa tgacatggtg 300  
 gatcagatgc atgaggatat aatcagttta tgggatcaaa gcctaaagcc atgtgtaaag 360  
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 aatagcgtgg ttaataatac cacaatgtt aataatagca tgaatggaga catgaaaaat 480  
 45 tgctctttca acataaccac agaactaaaa gataagaaaa agaattgtgta tgcacttttt 540  
 tataaacttg atatagtatc acttaatgag actgacgact ctgagactgg caactctagt 600  
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 aataataaga cattcaatgg gacaggacca tgccataatg tcagcacagt acaatgtaca 780  
 catggaatta agccagtgg atcaactcaa ctactgttaa atggtagcct agcagaagaa 840  
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 aatagatcta tagaaattgt gtgtgtaaga cccaacaata atacaagaca aagtataaga 960  
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 cattgtaaca ttagtaggac taactggact aagactttac gagaggtaag gaacaaatta 1080  
 agagaacact tccctaataa aaacataaca tttaaaccat cctcaggagg ggacctagaa 1140

SEQ 78

149

B

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 ataagacaaa ttataaatat gtggcaggaa gtaggacgag caatgtacgc ccctccatt 1320  
 5 gaaggaaaca tagcatgtaa atcagatatac acagggctac tattggttcg ggatggagga 1380  
 agcacaaatg atagcacaaa taataacaca gagatattca gacctgcagg aggagatatg 1440  
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 ggagctgtgt tccttgggtt cttgggagca gcaggaagca ctatgggcgc agcgtcaata 1620  
 10 acgctgacgg cacaggccag acaagtgttg tctggtatag tgcaacagca aagcaatttg 1680  
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 aataaatcta aaacagatat ttgggataac atgacctgga tgcagtggga tagagaaatt 1920  
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30 <213> Human immunodeficiency virus type 1

<220>

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35 <400> 81

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SEQ 79

150

B

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SEQ 80

151

B



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 <211> 579  
 <212> DNA  
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40  
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SEQ 81

152

B

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20 <213> Human immunodeficiency virus type 1

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SEQ 82

153 B

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<400> 87

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SEQ 83

154

B

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<211> 261

20 <212> DNA

<213> Human immunodeficiency virus type 1

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<400> 88

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    ccagctgggt atgcgattct aaagtgtaac aataagacat tcaatggaac aggaccatgc 720
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SEQ 84

155

B

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<210> 90

<211> 624

<212> DNA

35 <213> Human immunodeficiency virus type 1

<220>

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<210> 91

<211> 1491

SEQ 85

156

B

<212> DNA  
<213> Human immunodeficiency virus type 1

<220>

5 <223> isolate=94CY017.41; gene=gag

<400> 91

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<210> 92

35 <211> 3012

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

40 <223> isolate=94CY017.41; gene=pol

<400> 92

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SEQ 86

157

B

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<210> 93

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=vif

<400> 93

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aaacatcact atgaaagcag aaatccaaga ataagttcag aagtacacat cccgctaggg 180
gaggctagaa taatagtaag aacatatttg ggtctgcaca taggagaaaa agactggcac 240
ttgggtcatg gagtctccat agaatggagg caaaacaggt atcatacaca aatagaccct 300

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SEQ 87

158

B

gatctggcag accatctaata ccatctgtat tattttgact gtttttcaga atctgccata 360  
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 aaggtagggt ctctgcaata tttggcattg aaagcagtag tagcttcaac aaggacaaaag 480  
 ccacctttgc ctagtgttag gaaattagta gaggatagat ggaacaagcc ccagaagacc 540  
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<210> 94  
 <211> 291  
 <212> DNA

10 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=94CY017.41; gene=vpr

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 ataagatatc tgcaacaact actgtttgtc catttcagaa ttgggtgcca acatagcagg 240  
 20 ataggcatta ttcgaagaag aagagtaagg gatggagcca gtagacccta a 291

<210> 95  
 <211> 2655  
 <212> DNA

25 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=94CY017.41; gene=tat

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 aaaggcttag gcatctccta cggcaggaag aagcgacgac cccgacgaaa gccttctcca 180  
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SEQ 88

159



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<210> 96

<211> 2721

25 <212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=rev

30

<400> 96

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	tatacgcttt	ggaccaggac	aagccttcta	tacaaatgaa	ataatagggg	acataagaca	1260
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	attaagagag	aaattcccta	agaaaaccat	aatctttact	aactcctcag	gaggggaccc	1380

SEQ 89

16C

B

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    agtaggaaga gcaatgtatg cccctcccat tgcaggaata ataaagtgtg catcaaacat 1620
5   tacaggaata atattgacaa gagatgggtg taacaatggg actaatgaga cttcagacc 1680
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    acttgaacca ctaggagtag cacctaccag ggcaaaaaga agagtgggtg agagagaaaa 1800
    aagagcagtt ggactgggag ctgtcttcct tgggttcttg ggagcagcag gaagcactat 1860
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10  acagcaaagc aatttgctgc aggctataga agctcaacag catctgttga aactcacagt 1980
    ctggggcatt aaacagctcc aggcgagggt cctggctgtg gaaagatacc taaaggatca 2040
    acagctcctg ggaatttggg gctgctctgg aaactcatc tgcgccacta ctgtgccctg 2100
    gaacactagt tggagtaata agtctcagga tgagatttgg gacaacatga cctggttgca 2160
    atgggataaa gaaattagca attacacaaa cataatatat aggttacttg aagaatcgca 2220
15  aaaccagcag gaaaagaatg agcaagactt attggcatta gacaaatggg cagatttgtg 2280
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    aggcttgata ggattaagaa tagtttttgc tataattact gtagtaataa gagttaggca 2400
    gggatactca cctgtgtcat ttcagatccc taccccaagc ccagaggggc cgcacaggcc 2460
    cagaggaacc gaagaaggag gtggagagca aggcagagac agatcgattc gattagtga 2520
20  cggttcttc gcacttgctt gggacgacct acggagcctg tgctcttca gttaccaccg 2580
    cttgagagat tgcattatga ttgcagcgag gactgtggaa cttctgggac actgcagtct 2640
    caagggactg agactgggtt gggaagggtc caagaatctg tggaaatctt tggtatactg 2700
    ggtcgggaa ctgaagaata g                                     2721

```

```

25  <210> 97
    <211> 246
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

30  <220>
    <223> isolate=94CY017.41; gene=vpu

```

```

    <400> 97
    atgttacctt tagtaatatt ggcaatagta ggactgatag tagctttaat cttagcaata 60
35  gttgtatgga ctatagtatt catagaatat aagaaaatta agaagcaaag gaaaatagac 120
    tggttaatca aaagaataag tgagagagca gaagacagtg gcaatgagag tgatggggac 180
    acagaggaac tatcagcact tgtggagagg gggcatcttg attttgggga tgtaataaat 240
    gtgtaa                                     246

```

```

40  <210> 98
    <211> 2598
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

45  <220>
    <223> isolate=94CY017.41; gene=env

```

```

    <400> 98
    atgagagtga tggggacaca gaggaactat cagcacttgt ggagaggggg catcttgatt 60
50  ttggggatgt taataatgtg taaagctaca gatttgtggg tcacagtata ctatggagta 120
    cctgtgtgga aagatgcaga taccatccta ttttgtgcat cagatgctaa agcatatgat 180
    acagaagtgc ataatgtatg ggccacacat gcctgtgtac ccacagacc caaccacaa 240
    gaaataaacc tggaaaatgt aacagaaaat ttaatatgt ggaaaaataa catggtagag 300
    cagatgcaag aagatataat cagcttatgg gatcaaagcc taaagccatg tgtaaaatta 360

```

SEQ 90

161

B

```

accgccgtct ggcgtcatttt aaattgtagc aatgcccaata ccagcaccca tagcaatagc 420
agtagcaccc agagcccccataaatgaagaa ataaaaaact gctcttataa tactaccaca 480
atactaagag ataagacaca aaaagtttat tctactgtttt atagacttga tgtagtacaa 540
cttgatgaaa gtgaaaataa gaatacatca ggtagtataa ctctgtatag actaataaat 600
5 tghtaatacct caaccatcac acaagcgtgt ccaaaggtaa cctttgagcc aattcctata 660
cattattgtg cccagctgg ttttgcgatt cttaaagtgt aggatccgag attcaatgga 720
acagggctcat gcaagaatgt tagctcagta caatgtacac atggaattaa accagtagca 780
tcaactcaac tgctgttgaa tggcagtcga gcagaaggag ggaaaataat gattagatct 840
gaaaatatta caacaatgc caaaaacata atagtccagt ttactaagcc tgtactaatt 900
10 acttgtatca gacccaacaa caatacaaga aaaagtatac gctttggacc aggacaagcc 960
ttctatacaa atgaaataat aggggacata agacaagcac attgtaatat caacaaaaca 1020
ttatggaatg acactttaca aaaggtagct gaacaattaa gagagaaatt ccctaagaaa 1080
accataatct ttactaactc ctcaggaggg gacccagaaa ttacaacact tagttttaat 1140
tgtgcaggag aatttttcta ttgcaatata acaggcctgt ttaatggtag gtggtggaac 1200
15 aatggtagct ggaacgggccc ctacacacct aataacacca atggaagtat aatcctccca 1260
tgcagaataa aacaaattat aaacatgtgg cagagagtag gaagagcaat gtatgccctc 1320
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20 accagggcaa aaagaagagt ggtggagaga gaaaaaagag cagttggact gggagctgtc 1560
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gacttattgg cattagacaa atgggcagat ttgtggagtt ggttcaacat ttcacactgg 2040
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30 tttgctataa ttactgtagt aaatagagtt aggcaggat actcacctgt gtcatttcag 2160
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35 ggtctcaaga atctgtggaa tcttctgtta tactggggtc gggaaactgaa gaatagtgtc 2460
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atagggcaaa gagctttcag agctattctc aacataccta gaagaatcag acagggtcta 2580
gaaagggctt tactataa 2598

```

```

40 <210> 99
    <211> 654
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

45 <220>
    <223> isolate=94CY017.41; gene=nef

```

```

<400> 99
50 atgggggggca agtgggtcaaa aaggagcata ccaggatggc ctgctattag ggagagaatg 60
   agaagaactc ctccaacagc acaagaaca gaagcagtg ctccagcagc accaggagta 120
   ggagcagtg ctcaagattt agctactcat ggagcagta caagcagtaa tacagcagct 180
   actaatcctg attgcgcctg ggtggaagcg caagaagagg agagtgaagt aggttccca 240
   gtcaggccac aggtacctt aaggccaatg accttcaagg gagcgtttga tctcagcttc 300
   tttttaaaag aaaagggggg actggatggg ttaatttact cccagaaaag acaagacatc 360

```

SEQ 91

162

B

```

cttgatatgt ggggtctacca cacacaaggc tacttccttg attggcagaa ttacacacca 420
gggccaggga tcagataccc attaacattt ggatgggtgct tcaagctagt accagtagag 480
ccatctgagg tagaagaagc tactcaggga gagaacaaca gcttattaca ccctatatgc 540
caacatggag tagatgaccc tgaaagagaa gtgttaagat gggagtttga tagaagcctg 600
5 gcacggagac acagagcccg agagctgcat cggagtgact acaaagactg ctga 654

```

<210> 100  
<211> 1476  
<212> DNA

10 <213> Human immunodeficiency virus type 1

<220>  
<223> isolate=94IN476.104; gene=gag

```

15 <400> 100
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ttaaggccag ggggaaagaa acattatatg ataaaacact tagtatgggc aagcagggag 120
ctggaaagat ttgcgcttaa ccctggcctt ttagagacgt cagacggatg taaacaaata 180
ataaaacagc tacatccagc tcttaagaca ggaacagagg aacttaggtc attattcaac 240
20 acagtagcaa ctctctattg tgtacatgca gggatagagg tacgagacac caaggaagcc 300
ttagacaaga tagaggaaga acaaaacaaa agtcagcaaa aaatacagca ggcaaaagag 360
gctgacggaa aggtcagtc aaattatcct atagtgc aaa atctccaagg gcaaatggta 420
caccagcccc tatcacctag aactttgaat gcgtgggtaa aagtaataga ggagaaggct 480
tttagccag aggtaatacc catgttcaca gcattatcag aaggagccac cccctctgat 540
25 ttaaacacca tgtaaatac agtgggggga catcaagcag ccatgcaaat gttaaaagat 600
accatcaacg aggaggctgc ggaatgggat agattacatc cagtacatgc agggcctaata 660
ccaccaggcc agatgagaga accaagggga agtgatatag caggaactac tagtaccctt 720
caggaacaaa tagcatggat gacaggtaac ccacctattc cagtgggaga catctataaa 780
agatggataa ttctgggggt aaataaaata gtaagaatgt atagccctgt cagcattttg 840
30 gacataagac aagggccaaa ggaaccctt agagactatg tagaccggtt ctttaaaact 900
ttaagagctg aacaagctac acaagaagta aaagggtgga tgacagacac cttgttggtc 960
caaaatgcaa acccagattg taagaccatt ttaagagcat taggaccagg ggcttcatta 1020
gaagaaatgg tgacagcatg tcaaggagtg ggaggacctt gccacaaagc aagagtgttg 1080
gctgaggcaa tgagccaatc acatagtaac ataatgatgc agagaggcaa ttttaaaggc 1140
35 cctaaaagaa ttgttaaata cttcaactgt ggcaagggaag ggcacatagc cagaaattgc 1200
agggccccta gaaaaagagg ctgttggaag tgtgggcaag aaggacacca aatgaaagac 1260
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gggaatttcc ttcaaaacag gccagagcca acagccccac cagcagagag cttcagggtc 1380
aaggagacaa cccccgtcc gaagcaggag tcgaaagaca gggaaccctt aacttcctc 1440
40 aaatcactct ttggcagcga ccccttgtct caataa 1476

```

<210> 101  
<211> 3011  
<212> DNA

45 <213> Human immunodeficiency virus type 1

<220>  
<223> isolate=94IN476.104; gene=pol

```

50 <400> 101
tttttttaggg aaaatttggc cttcccacaa ggggaggcca gggaatttcc ttcaaaacag 60
gccagagcca acagccccac cagcagagag cttcagggtc aaggagacaa cccccgtcc 120
gaagcaggag tcgaaagaca gggaaccctt aacttcctc aaatcactct ttggcagcga 180
cccccttgtct caataaaagt agggggccag ataaaggaag ctctcttaga cacaggagca 240

```

SEQ 92

163

B

gatgatacag tattagaaga aatagctttg ccaggaagat ggaaaccaa aatgatagga 300  
 ggaattggag gttttatcaa agtaagacag tatgatcaa tacttataga aatttgtgga 360  
 aaaaaggcta taggtacagt attagtagga cctacacctg tcaacataat tggaagagat 420  
 atgttgactc agcttggatg cactctaaat tttccaatta gccccattga aactgtacca 480  
 5 gtaaaattaa agccaggaat ggatggccca aagggttaa acgtggccatt gacagaagag 540  
 aaaataaaag cattaacaga aatttgtaaa gaaatggaga aggaaggaaa aattacaaaa 600  
 attgggcctg aaaatccata taacactcca gtatttgcca taaaaggaa ggacagtact 660  
 aagtggagaa aattagtaga ttccagggag ctcaataaaa gaactcaaga cttttgggaa 720  
 gttcaattag gaataccaca cccagcaggt ttaaaaaaga aaaaatcagt gacagtactg 780  
 10 gatgtggggg atgcatattt ttcagttcct ttagatgaag gcttcgggaa atatactgca 840  
 ttcaccatac ctagtataaa caatgaaaca ccagggatta gatatacaata taatgtgctt 900  
 ccacagggat ggaaaggatc accagcaata ttccagagta gcatgacaaa aatcttagag 960  
 cccttttaggg cagcaaatcc aaaaatagtc atctatcaat atatggatga cttgtatgta 1020  
 ggggtctgact tagaaatagg gcatcataga gcaaaaatag aggagttaag agcacatcta 1080  
 15 ttaaagtggg gattcaccac accagataag aaacatcaga aagaaccccc atttctttgg 1140  
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 20 ctaaaagagc cagtacatgg agtatattat gacccatcaa aagacttaat agctgaaata 1440  
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 aaaacagggg agtatgcaaa aatgaggact gctcacacta atgatgtaaa acagttaaca 1560  
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 gactacccat ccaaaaagaa acgtggggaga catggtggac agactatttg caggccacct 1680  
 25 ggattcctga ttgggagttt gttaataccc ctcccctagt aaaattatgg taccagctag 1740  
 aaaaagaacc catagtagga gcagaaactt tctatgtaga tggagcagct aatagggaaa 1800  
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 gaacagaagt aaacatagta acagactcac agtatgcatt aggaatcatt caagcacaac 1980  
 30 cagataaaag tgaatcagag ttagtcaacc aaataataga acaattaata aacaaagaaa 2040  
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 40 tagtagaatc catgaataaa gaattaaaga aaattatagg gcaggtaaga gaacaagctg 2640  
 agcaccttaa gacagcagta caaatggcag tattcattca caattttaaa agaaaagggg 2700  
 ggattggggg gtacagtgcg ggggaaagaa caatagacat aatagcaaca gacatacaaa 2760  
 ctaaagaatt acaaaaacca attacaaaaa ttcaaaattt tcgggtttat tacagagaca 2820  
 gcagagaccc catttggaag ggaccagcca aactgctctg gaaaggtgaa ggggcagtag 2880  
 45 taatacaaga taatagtgc ataaaggtag tgccaaggag gaaagcaaaa attattaggg 2940  
 attatggaaa acagatggca ggtgctgatt gtgtggcagg tagacaggat gaggatcaga 3000  
 acatggaata g 3011

<210> 102

50 <211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

SEQ 93

164

B

<223> isolate=94IN476.104; gene=vif

<400> 102

5 atggaaaaca gatggcaggt gctgattgtg tggcaggtag acaggatgag gatcagaaca 60  
tggaatagtt tagtaaaaca ccatatgtat gtttcaagaa gagctagtgg atggttttac 120  
agacatcatt atgaaagcag acatccaaaa gtaagtgcag aagtacacat cccattagga 180  
gatgctagat tagtaataaa aacatattgg ggtttacaaa caggagaaag agattggcat 240  
ttgggtcatg gcgtctccat agaatggaga ttgggaagat atagcacaca agtagaacct 300  
ggcctggcag accagctaata ccatatgcat tattttgatt gttttgcaga ctctgccata 360  
10 agaaaagcca tattaggaca catagttatt tctaggtgtg attatcaagc aggacataat 420  
aaggtaggat ctctacaata cttggcactg acagcattga taaaaccaa aaagagaaag 480  
ccacctctgc ctagtgttaa gaaattagta gaggatagat ggaacaatcc ccagaagacc 540  
agggaccaca gaggggaacca tacaatgaat ggacactag 579

15 <210> 103

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

20 <220>

<223> isolate=94IN476.104; gene=vpr

<400> 103

25 atggaacaat cccagaaga ccagggacca cagagggaac catacaatga atggacacta 60  
gagcttctag aggaactcaa gcaggaagct gtcagacact ttcctagacc ttagcttcat 120  
agcttaggac aatataatcta tgaaacatat ggggatgctt ggacaggagt cgaagcttta 180  
ataagaacac tgcaacaatt actgtttatt catttcagaa ttgggtgcca gcatagcaga 240  
ataggcattt tacaacggag aagagcaaga aatggagcca gtagatccta a 291

30 <210> 104

<211> 2633

<212> DNA

<213> Human immunodeficiency virus type 1

35 <220>

• <223> isolate=94IN476.104; gene=tat

<400> 104

40 atggagccag tagatcctaa cctagagccc tggaaaccatc caggaagtca gcctaaaact 60  
gcttgtaata catgctattg taaacactgt agctaccatt gtctagtttg ctttcagaca 120  
aaaggcttag gcatttccta tggcaggaag aagcggagac agcgacgcag cgctcctcca 180  
agcagtggag atcatcaaaa tcttatatca aagcagtaag tatatgtaat ggtgaattta 240  
ttagaaagag tagattatag attaggagta ggagcattaa tagtagcatt aatccttagca 300  
ataattgtgt ggaccatagc atatctagaa tataggaaat tgtaagaca aagaaaaata 360  
45 aacagggttaa ttgaaagaat tagggaaaga gtagaagaca gtggcaatga gagtgagggg 420  
gatactgagg aattgtcaac actggtggat atggggaatc ttaggccttt ggatgctaata 480  
gatttataat gtagtaggga acttgtgggt cacagtctat tatgggttac ctgtgtggaa 540  
agaagcaaaa actactttat tctgtgcatc agatgctaaa gcttatgaga aggaggtgca 600  
taatatctgg gctacacatg cctgtgtacc cacagacccc aaccacaag agatggattt 660  
50 agtaaatgta acagaaaatt ttaacatgtg gaaaaatgac atggtggatc agatgcatga 720  
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aaaaaattgc tcttttaatg caaccacaga aataagagac aagaaacgca aagagtatgc 900  
actgttttat agactcgata tagtaccact aatatgagaat aagaacagct ctagtaacta 960

SEQ 94

165

B

```

tagtgagtac atattaataa attgtaatac ctcaaccata acacaagcct gtccaaaggt 1020
ctcttttgac ccaattccta tacattattg tgctccagct ggttttgcga ttctaaagtg 1080
taaagatgag acattcaatg ggacaggacc atgcaaggag gtcagtacag tacaatgtac 1140
5 acatggaatt aagccagtgg tatcaactca actactgtta aatggtagca cagcagaaaa 1200
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taatgaatcc ataaaaattg tatgtacaag acccaacaat aacacaagaa aaagtataag 1320
gatagggcca ggacaagcat tctatgcaac aaacggcata ataggagaca taagacaagc 1380
acattgtaac attagtgaat ctaactggac taaaacttta caagaggtag gaaaaaaatt 1440
10 agcaaagcac ttccctaata aaacaataag tttcaaccaa tcttcaggag gggacctaga 1500
aattgtaaca catagcttta attgtggagg agaattcttt tattgtaata catcaagact 1560
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15 aggaggagat atgagggaca attggagaag tgaattatat aaatataaag tggtagaaat 1860
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25 ttggtttagc ataacaaaat ggctgtggta tataaaaaata ttcataatta tagtaggagg 2460
cttgataggt ttgagaataa tttttgctgt gctatctata gtaaataagag ttaggcaggg 2520
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aggaatcgaa gaagaaggtg gagagcaaga caaagacaga tccattcgat tag 2633

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```

30 <210> 105
    <211> 2651
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

35 <220>
    <223> isolate=94IN476.104; gene=rev

```

```

    <400> 105
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   gattaggagt aggagcatta atagtagcat taatcttagc aataattgtg tggaccatag 180
   catatctaga atataggaaa ttgttaagac aaagaaaaat aaacaggtta attgaaagaa 240
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   aattgtaata cctcaacat aacacaagcc tgtccaaagg tctcttttga cccaattcct 900
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```

SEQ 95

166

B

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    gaaaatataa cagacaatgc aaaaactata atagtacatc ttaatgaatc cataaaaatt 1140
    gtatgtacaa gacccaacaa taacacaaga aaaagtataa ggatagggcc aggacaagca 1200
5   ttctatgcaa caaacggcat aataggagac ataagacaag cacattgtaa cattagttaa 1260
    tctaactgga ctaaaacttt acaagaggta ggaaaaaaat tagcaaagca cttccctaata 1320
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    aattgtggag gagaattctt ttattgtaac acatcaagac tgtttaacgg tacatataat 1440
    ggtacagaca tgcctacata caatggtaga aattccagtt cagacatcat catgcttcca 1500
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    gcagcgagag cgggtggaact tctgggacgc agcagtctca ggggactaca gaggggggtg 2640
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```

```

30  <210> 106
    <211> 261
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

35  <220>
    <223> isolate=94IN476.104; gene=vpu

```

```

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    caaagaaaaa taaacagggt aattgaaaga attagggaaa gagtagaaga cagtggcaat 180
    gagagtgagg gggatactga ggaattgtca acactggtag atatggggaa tcttaggctt 240
    ttggatgcta atgatttata a 261

```

```

45  <210> 107
    <211> 2574
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

50  <220>
    <223> isolate=94IN476.104; gene=env

```

```

    <400> 107

```

SEQ 96

167

B



```

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gtacctgtgt ggaaagaagc aaaaactact ttattctgtg catcagatgc taaagcttat 180
gagaaggagg tgcataatat ctgggctaca catgcctgtg taccacaga ccccaacca 240
5 caagagatgg atttagtaaa tgtaacagaa aattttaaca tgtggaaaaa tgacatggtg 300
gatcagatgc atgaggatgt aatcagttta tgggatcaaa gcctaaagcc atgtgtaaag 360
ttgacccac tctgtgtcac tttaaactgt agtaaggtta ccaataatgc tacttacaat 420
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cgcaaagagt atgcaactgt ttatagactc gatatagtac cactaaatga gaataagaac 540
10 agctctagta actatagtga gtacatatta ataaattgta atacctcaac cataacacaa 600
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25 aaagtggtag aaattaagcc attaggaata gcacctactg aagcaaaaag gagagtgggtg 1500
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```

```

45 <210> 108
    <211> 624
    <212> DNA
    <213> Human immunodeficiency virus type 1

```

```

50 <220>
    <223> isolate=94IN476.104; gene=nef

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```

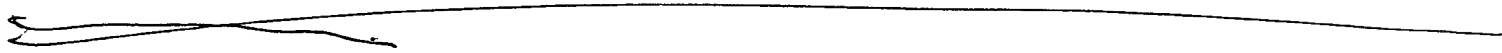
SEQ 97

168

B

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 10 ccggagtatt acaaagactg ctga 624

B1  
 concluded  
 10



169

B